

# Philosophy of Physics Part II Physics Lectures

## Lecture 1: Reciprocal constraints of Physics & Philosophy

2. The two cultures - objective v. Subjective.
3. 1st book (negative pages)
4. 2nd book activity - Mersenne v. Mersenne
5. What is physics - Natural sciences  
 & phenomena matter & energy deployed  
 through space & time - Theory derivation - Unification
6. What is Philosophy: credit holes & its  
 cognitive enterprise - speculation & justification  
 analysis expenditure
7. Q.C.D. example
8. On Physics lecture in Q.C.D.  
 of classical mechanics core  
 problems a) QM, b) renormalization, c)  
 and how of adjustable parameters
9. How to use of T.O.E
10. Quant. Consequence
11. Room - Evidence of Observation
12. Philosophy now:  
 Formalism, Empiricism v. rationalism,  
 Positivism, Pragmatism, Realism, Relativism, Postmodernism
13. Instability Problem - Extremes: relativism, Realism
14. Problem - Conceptual realism
15. Difficulties with Realism:  
 (a) Undeterminism  
 (b) Lack of convergence  
 (c) Very multiple  
 (d) Further structure

## Lecture 2 1. The view from nature

2. Primary and secondary qualities
3. Relations at the observer - relative relations
4. Relative relations are not - shadow example
5. Statistical mechanics - subjected approach to Entropy.
6. Cylinder expansion:  $\Delta S = k \ln \frac{V_f}{V_i}$   
equations with  $\int \frac{dQ}{T}$  in small virtual expansion.
7. Statistical mechanics  $S = -k \sum_{n=1}^W p_n \ln p_n$   
Put  $p_n = \frac{1}{W} \Rightarrow S = k \ln W$  - Boltzmann - Planck.
8. Coarse graining and irreversibility
9. QM mechanics - observables, exp. averages
10. QM measurement theory - S. Cat.  
- role of consciousness.
11. Anthropic Principle, weak > strong version

# Lecture 3

1. Realism & antirealism in QM. (by van Fraassen)
2. What is value of  $\hbar$  also not in an agent's?
3. Superficial metaphysics
3. Realism solves the measurement problem and is proved by the EPR argument (1935)
4. But Bell (1964) shows  $R \rightarrow B.I.$  violated by prediction of QM and by exp! Aspect (1982)
5. But also  $A \rightarrow LRA$ ?  
Show Transference in EPR  
Then summary of Bell's & QM Transference
6. Kocher-Speiser paradox
7. Heywood's result
8. OLOC & ELOC.
9. Lewis et al. of a Unlocal Rand.
10. Part-whole reductions
11. classical flow-state
12. Hilbert space - Quantum Entanglement
13. Role of OLOC in Mermin's proof of Bell's & Particularism.
14. Reductive hierarchy  $EPR \rightarrow M.T. \rightarrow C.L. \rightarrow B.I.$
15.  $\rightarrow$  Social Science  
My class of

## Lecture 4

1. Hantson 1980 Margaret Carter, 'Is the End in Sight for Theoretical Physics?'
2. Kelowna - most decent place
3. of exploration of globe
4. Born 'Physics will be as in 6 months' returns to Dirac Eq. 1927.
5.  $N=8$  extended supergravity (Hochberg)  
→ Sheng Sheng
6. Coed a TOE causing anything: D.N. model of explanation
7. But indeterminism: Can't explain why we're here. initial boundary conditions may not be contingent - of indeterminism - Difficult of producing an one theory in physics.
8. Bookshop physics
9. Interdisciplinary aspect of physics - explain chemistry, biology, even psychology.
10. In principle v. in practice reduction.
11. Physics still may be just a patchwork - of causality.
12. Chinese losses v. TOE  
of affected field theory v. string theory
13. Popperian image of peer-to-peer - established response of colleagues - TOE is a speculative idea (cf Kant) - even if it does not exist of Atomism programme.
14. Are we getting nearer to explanation - Physics is second  
P.R.

15. Techniques yes, structural seems Tardus

16. Incommensurability - Diachronic relations  
between them - 26 Causation

17. Properly Kuhn - loose  
Closed limits,  $1/0 \rightarrow 0$ ,  $t \rightarrow 0$ , etc

18. Shows 3 types of behavior

19. Logical limits, ex. use ex.  $\lim_{x \rightarrow 0} (1/x)$

20. V-P space - multidimensional

V-dimension

distances

Show Transitions  
of approach to TUE

distances  
path length

prov.  
100%

percent of

21. Part's, Remedy of distant proposition.  
(of Proposition) "Every answer leads  
back to a new question".

22. Propable Conclusions - increasingly clear  
- better degree  
of  $10^{-16}$  cm (100 GeV)  $10^{-29}$  cm  
Planck length  $10^{-33}$  cm ( $10^{21}$  GeV) ( $10^{17}$  GeV)

23. Dangers of Question

24. Resolution - Gold's version.

25. Explanation of Actions & of TUE.

26. Introduction of Physics, Philosophy.